Exhibit J

Electronic Acknowledgement Receipt

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Title of Invention:	DIGITAL MULTI-BAND PREDISTORTION LINEARIZER WITH NONLINEAR SUBSAMPLING ALGORITHM IN THE FEEDBACK LOOP
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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment Submitted/Entered with Filing of CPA/RCE	4207-113_2016-03-17_RespFOA2.pdf	348571 3d2b68f519265e23d70688c49c51030551fcfbfd	no	8
Warnings:					
Information:					
2	Request for Continued Examination (RCE)	4207-113_RESP_FOA2_RCE.pdf	697808 6ae1ccd32e547e79d074dcb9c2bd566e09cf60a2	no	3
Warnings:					
Information:					
3	Extension of Time	4207-113_RESP_OA2_ext_of_time.pdf	187505 3bdb3197d935aeeee73b1f4eb03ae7b7431fc76	no	2
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	32720 741c755d502c27cce65bc3c19366fa6494ca8aa5	no	2
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Fadhel M. Ghannouchi et al		
Assignee:			
Title:	DIGITAL MULTI-BAND PREDISTORION LINEARIZER WITH NONLINEAR SUBSAMPLING ALGORITHMS IN THE IN THE FEEDBACK LOOP		
Serial No.:	14/467,642	Filing Date:	08/25/2014
Examiner:	Joseph, Jaison	Group Art Unit:	2633
Docket No.:	4207-11 3	Customer No.:	43563
		Confirmation No.	1866

May 17, 2016

RESPONSE TO FINAL OFFICE ACTION

Dear Sir:

This is in response to the Final Office Action dated 12/17/2015. A request for continued examination is submitted herewith. Please consider the following:

Amendments to the Claims are reflected in the Listing of Claims which begins on page 2;

Remarks begin on page 6.

Amendments To The Claims

Listing of Claims

This Listing of Claims will replace all prior versions, and listings of claims in the application:

1. (Currently amended) A transmitter comprising:

a power amplifier configured to amplify ~~a~~ modulated concurrent multi-band ~~signal~~ signals to provide ~~an~~ amplified concurrent multi-band signals;

a concurrent digital multi-band predistortion block configured to effect predistortion of the modulated concurrent multi-band ~~signal~~ signals to compensate for a non-linearity of the power amplifier; and

a signal observation feedback loop configured to effect concurrent sampling of the amplified concurrent multi-band signals at a subsampling frequency lower than twice a highest signal frequency in the amplified concurrent multi-band signals.

2. (Previously presented) The transmitter of claim 1, wherein said concurrent digital multi-band predistortion block further comprises:

a plurality of digital baseband signal predistorter blocks, each baseband signal predistorter block having a plurality of first inputs and a single output, the plurality of first inputs corresponding in number to the multiple bands of the multi-band transmitter and each first input corresponding to a single frequency channel.

3. (Previously presented) The transmitter of claim 2, wherein said concurrent digital multi-band predistortion block further comprises:

a plurality of digital baseband signal predistorter blocks, each baseband signal predistorter block having a plurality of first inputs and a single output, the plurality of first inputs corresponding in number to the multiple bands of the multi-band transmitter and each first input corresponding to a single frequency channel and wherein the signal observation feedback loop includes an

analyzing and modeling stage directly connected to each of the plurality of outputs of said digital multi-band predistortion block for receiving the respective predistorted signals and for using said received predistored signals in controlling said digital multi-band predistortion block and wherein

4. (Previously presented) The transmitter of claim 3, wherein said analyzing and modeling stage further comprises:

a plurality of outputs connected to and for updating the parameters of said digital baseband signal predistorter block;

a plurality of inputs connected to said outputs of said signal observation feedback loop.

5. (Previously presented) The transmitter of claim 3, wherein said analyzing and modeling stage is further configured to:

perform time alignment of complex baseband signals from sampling said outputs of said power amplifier; and

perform the reconstruction of the complex baseband signals from sampling said outputs of said power amplifier.

6. (Previously presented) The transmitter of claim 2, wherein said signal observation feedback loop further is further configured to:

down-convert samples of the RF signals at said output of the power amplifier; and

extract from said down-converted samples a baseband equivalent for all frequency channels.

7. (Previously presented) The transmitter of claim 2, wherein said signal observation feedback loop further comprises for each channel an RF filter;

a signal down conversion block; and

an analog-to-digital converter (ADC).

8. (Previously presented) The transmitter of claim 2, wherein said signal observation feedback loop further comprises:

a single subsampling-based receiver to down-convert samples output from a concurrent multi-band transmitter.

9. (Previously presented) The transmitter of claim 8, wherein said single subsampling-based receiver further comprises:

an RF filter; a track and hold (T&H) block; and an analog-to-digital converter (ADC).

10. (New) The transmitter of claim 1, wherein the subsampling frequency is greater than two times a signal bandwidth of the modulated concurrent multi-band signals.

11. (New) The transmitter of claim 1, wherein the subsampling frequency f_s is in a range $2f_0/n \leq f_s \leq 2f_1/(n-1)$ where $1 \leq n \leq \lfloor f_0/B \rfloor$,

and where B is a bandwidth of the amplified concurrent multi-band signals, and f_l, f_u are respective lower and upper frequencies of the bandwidth, and *n* is an integer.

12. (New) A method at transmitter comprising:

amplifying a modulated concurrent multi-band signal to provide an amplified concurrent multi-band signal;

predistorting the modulated concurrent multi-band signal to compensate for a non-linearity of the power amplifier;

subsampling of the amplified concurrent multi-band signals at a subsampling frequency lower than twice a highest signal frequency in the amplified concurrent multi-band signal; and

controlling the predistorting by the subsampled concurrent multi-band signal.

13. (New) The method of claim 12, wherein the subsampling frequency is greater than two times a signal bandwidth of the modulated concurrent multi-band signal.

14. (New) The method of claim 12, wherein the subsampling frequency is chosen to avoiding aliasing
between replicas.

15. (new) The method of claim 14, wherein the chosen subsampling frequency fs for a given signal bandwidth and carrier frequency fc is in the range $2f_L/n \leq fs \leq 2f_L/(n-1)$ where $1 \leq n \leq |f_U/B|$, and where B is a bandwidth of the amplified concurrent multi-band signal, and f_L, f_U are respective lower and upper frequencies of the bandwidth, and n is an integer.

REMARKS

Claims 1 has been amended to better define the subject matter. New claims 10-11 have been added. Support for the amendments and new claims are found *inter alia* in paragraphs [0041]-[0042] of the description and Figure 6 of the drawings.

Furthermore, new method claims 12-15 corresponding to the device claims have been added.

No new matter has been added.

Claim Rejections – 35 USC § 102

i. Claims 1 is rejected under 35 U.S.C. 102(b) as being anticipated by newly cited Suzuki (US 2005/0162225).

The present claims relate in general to subsampling in a feedback loop of modulated concurrent multi-band signals. Applicant submits that it is well known in the art of signal communication that subsampling is the process of sampling at a frequency less than the Nyquist rate.

Accordingly, independent claim 1 has been amended to recite amongst others the features of:

"a power amplifier configured to amplify modulated concurrent multi-band signals to provide amplified concurrent multi-band signals";

"a signal observation feedback loop configured to effect concurrent sampling of the amplified concurrent multi-band signals";

"a subsampling frequency lower than twice a highest signal frequency in the amplified concurrent multi-band signals".

Suzuki does not teach or suggest "subsampling" nor does Suzuki teach or suggest sampling of the "modulated concurrent multi-band signals" (i.e. the modulated "amplified concurrent multi-band signals") as recited in amended claim 1. Suzuki discloses AD conversion of a demodulated portion of the output signal. See for example Suzuki para. [0037] which states "*The monitor signal SM is demodulated by a monitoring receiver 31, and the* ***demodulated monitor signal is converted*** *by analog-to-digital converters (ADC) 32-1 and 32-2 to I and Q signals (i.e., an in-phase signal and a quadrature signal) in digital form*".

Suzuki cannot anticipate claim 1 as amended. Accordingly, the rejection of claim 1 under 35 U.S.C. 102(b) is overcome. Withdrawal of the rejection is requested.

ii. Claims 1, 2 and 6-8 are rejected under 35 U.S.C. 102€ as being anticipated by Fuller.

Fuller similar to the discussion of Suzuki does not teach or suggest "subsampling" nor does Fuller teach or suggest sampling of the "modulated concurrent multi-band signals" (i.e. the modulated "amplified concurrent multi-band signals") as recited in amended claim 1.

For example, Fuller in reference to FIG. 2 states at col 6, lines 26-30 "A portion of the output energy of amplifier **212** is coupled via coupler **251** and downconverted to a suitable intermediate frequency by mixer **230**".

Further Fuller does not teach or suggest a "concurrent sampling of the amplified concurrent multi-band signal" as recited in amended claim 1. As shown in Figure 1 and Figure 2 of Fuller the feedback signals are mixed to select a particular frequency (See mixer 130 (Fig. 1) and Mixer 230 (Fig. 2)). This is not "concurrent sampling of the amplified concurrent multi-band signal".

Accordingly, applicant submits that for at least the above reasons claim 1 is patentable over Fuller and the rejection of claim 1 and claims 2, 6-8 dependent thereon is overcome. Withdrawal of the rejection is requested.

Claim Rejections – 35 USC § 103

i. Claims 2, 6-9 are rejected under 35 U.S.C. 103a as being unpatentable over Suzuki in view of Fuller.

Based on at least the above discussion Applicant submits that amended independent claim 1 is allowable over Suzuki and Fuller, therefore claims 2, 6-9 which depend thereon are also allowable, rendering the rejection moot. Withdrawal of the rejection is requested.

Based on at least the above discussion Applicant submits that amended independent claim 1 is allowable over Fuller, therefore claim 9 which depends thereon is also allowable, rendering the rejection moot. Withdrawal of the rejection is requested.

Double patenting

Claims 1-9 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-9 of US Patent No. 8,817,859.

Applicant submits that claim 1 of the Patent does not recite all the limitations of amended claim 1 of the instant application. Furthermore, as the claims in the instant application are still pending, Applicant requests the rejection be held in abeyance subject to allowance of the present claims.

Conclusion

In view of the amendments and remarks set forth herein, the application is believed to be in condition for allowance and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the examiner is requested to telephone the undersigned at.

Respectfully submitted,

/Kevin Pillay/

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